

**Transient Room Tax
2013 – 14 Budget**

Revenue \$80.000

50% Event Support	40,000
Summer Games	30,000
Shakespeare	<u>10,000</u>
Balance	-0-

40% Marketing, Recruitment	32,000
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Byron Travel & Training	24,600
Byron Special Event Support	<u>7,400</u>
Balance	-0-

10% Reserve	8,000
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Proposed Project Synopsis

Project A: Evaluate Recharge of Water Flowing to Quichapa Lake on the Quichapa Canyon Alluvial Fan

TASK

- Compilation of existing geologic, hydrologic, and geophysical data of proposed recharge area
- Includes well logs and geophysical data to characterize texture and thickness of sediment.
- Examine water quality issues and possible availability of alternate sources of recharge water.

Product

- A written report describing the geologic setting of the proposed recharge area and a summary of water quality and availability.
- A feasibility recommendation to determine if the water is sufficient in quality and quantity.
- Recommended location for an infiltration-pond site.

Project B: Evaluate Recharge of Coal Creek Water in East-Central Cedar Valley

Task

- Examine feasibility existing gravel pits or new sites (gravel pits & area NW of Cross hollow hills)
- Compile existing geologic, hydrologic, and geophysical data to characterize the geologic setting
- Examine clast lithology of sediment deposited by Coal Creek to determine the different upstream sources of the sediment load in Coal Creek.

Product

- A written report describing the geologic setting of the proposed recharge area and a summary of water quality and availability.
- A feasibility recommendation to determine if the water is sufficient in quality and quantity.
- Recommended location for an infiltration-pond site that will allow the recharged groundwater to flow east toward existing water-production wells northwest of Cedar City, or near the Cross Hollow Hills.

Project C. Evaluate Current Cedar City Groundwater Recharge Project

Task

- Will conduct geologic and geophysical studies to determine flow of groundwater recharged in a gravel pit at the southwest end of Cedar City Municipal Airport, an ongoing project of Cedar City.
- Identify water-level changes caused by infiltration by using existing monitoring wells, measure water levels in these wells before, during, and after infiltration, and conduct a high-precision gravity survey during the same time frame. (high-precision gravity surveys can measure and track the change in mass caused by the infiltrated water.

Products

- A written report describing the geologic setting of the proposed recharge area and a summary including cross sections that show the stratigraphy of the basin-fill deposits, and the results of groundwater-level monitoring and gravity surveys.
- A series of maps showing the growth and movement of the groundwater mound.
- Identify the most likely aquifer(s) that receives the infiltrated water.

**PROPOSED UTAH GEOLOGICAL SURVEY FEASIBILITY STUDY FOR
ENHANCED GROUNDWATER RECHARGE, CEDAR VALLEY, IRON
COUNTY, UTAH**

Introduction

Central Iron County Water Conservancy District (CICWCD) requested a proposal from the Utah Geological Survey (UGS) to study geologic and water-quality aspects of artificial recharge of spring runoff water in Coal Creek to the basin-fill aquifer of Cedar Valley. CICWCD expressed interest in a project in which surface water flowing to Quichapa Lake would be intercepted before it reaches the lake and pumped through a pipeline to the alluvial fan emanating from Quichapa Canyon in the Harmony Mountains about two miles southwest of the lake. During a meeting between CICWCD and the UGS, the parties discussed this possible project and other additional or alternative scenarios for use of Coal Creek flow. This proposal describes the UGS scope of work to examine three possible artificial-recharge projects in Cedar Valley. If one or more projects are funded, it is expected that the UGS will begin work on July 1, 2013, and that a draft report outlining the results of the project study(s) will be issued prior to June 30, 2014.

Research of and direct experience with artificial-recharge projects indicates that monitoring wells constructed specifically for and dedicated solely to the project are essential parts of any artificial-recharge project. These wells provide vital information about the subsurface geology, movement of water, and changes in water quality below and around the infiltration pond. We do not include well construction in the following evaluations, but recommend that any future project includes one or more monitoring wells.

Proposed Projects

Project A. Evaluate Recharge of Water Flowing to Quichapa Lake on the Quichapa Canyon Alluvial Fan

Tasks. UGS will compile existing geologic, hydrologic, and geophysical data to characterize the geologic setting of the proposed recharge area, examine issues related to the quality of water flowing to Quichapa Lake, and the possible availability of surface water in the Harmony Mountains as an alternate source of recharge water. We will examine existing well logs and geophysical data to characterize the texture and thickness of sediment to which the surface water would be recharged. We may recommend additional water-quality sampling as part of the feasibility study. We will collect new gravity data to supplement existing data, to better characterize the subsurface geometry of these sediments.

Products. UGS will produce a written report describing the geologic setting of the proposed recharge area, and a summary of water quality and availability. UGS will recommend whether water of sufficient quality and quantity exists to make the project feasible. If the project seems feasible, UGS will recommend a possible infiltration-pond site that will allow the recharged groundwater to flow toward the nearby Cedar City water-production wells. Geologic cross sections through the basin-fill deposits will identify the most likely aquifer(s) that would receive the infiltrated water. A schematic map of the thickness of basin-fill deposits will help characterize the geologic setting of the project area.

Project B. Evaluate Recharge of Coal Creek Water in East-Central Cedar Valley

Tasks. UGS will examine the feasibility of using existing gravel pits or new sites near Cedar City for infiltration of available Coal Creek water. Possible sites for study include gravel pits north of Cedar City and west of Interstate-15, and eastern Cedar City Valley immediately northwest of the Cross Hollow Hills. UGS will compile existing geologic, hydrologic, and geophysical data to characterize the geologic setting of possible recharge areas, and review existing water-quality data. We may recommend additional water-quality sampling as part of the feasibility study. We will collect new gravity data to supplement existing data, to better characterize the subsurface geometry of these sediments. We will examine clast lithology of sediment deposited by Coal Creek to determine the different upstream sources of the sediment load in Coal Creek.

Products. UGS will produce a written report describing the geologic setting of the proposed recharge area, and a summary of water quality and availability. UGS will recommend a possible infiltration-pond site that will allow the recharged groundwater to flow east toward existing water-production wells northwest of Cedar City, or near the Cross Hollow Hills. Geologic cross sections through the basin-fill deposits will identify the most likely aquifer(s) that would receive the infiltrated water. A schematic map of the thickness of basin-fill deposits will help characterize the geologic setting of the project area.

Project C. Evaluate Current Cedar City Groundwater Recharge Project

Tasks. UGS will conduct geologic and geophysical studies to determine flow of groundwater recharged in a gravel pit at the southwest end of Cedar City Municipal Airport, an ongoing project of Cedar City. UGS will identify possible existing monitoring wells to identify water-level changes caused by the infiltration, measure water

levels in these wells before, during, and after infiltration, and conduct a high-precision gravity survey during the same time frame. High-precision gravity surveys can measure and track the change in mass caused by the infiltrated water.

Products. UGS will produce a written report describing the geologic setting of the proposed recharge area, including cross sections that show the stratigraphy of the basin-fill deposits, and the results of groundwater-level monitoring and gravity surveys. These data will likely result in a series of maps showing the growth and movement of the groundwater mound created by infiltration in the gravel pit. Cross sections through the basin-fill deposits will identify the most likely aquifer(s) that receives the infiltrated water. A schematic map of the thickness of basin-fill deposits will help characterize the geologic setting of the project area.

Estimated Effort and Cost for Each Proposed Project

The spreadsheet used to calculate costs based on the estimated time and travel estimates below is included as attachment A. The cost estimate includes 40 hours project oversight by the manager of the UGS Groundwater and Paleontology Program; this cost remains the same regardless of how many projects are funded. If one or more project is funded, the UGS will bill the Central Iron County Water Conservancy District monthly for work completed in the previous month.

Project A. Evaluate Recharge of Quichapa Lake Water on the Quichapa Canyon Alluvial

Fan

Personnel

Research	4 weeks
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Gravity Survey 1 week
Field Work 2 weeks
Report Writing 6 weeks

Fieldwork/Travel

15 days per diem, 15 days vehicle rental, 1,650 vehicle miles, 12 nights hotel

Estimated cost

Total direct costs for Project A	\$ 35,318
Indirect costs (34.44% of direct costs)	\$ 12,163
Total cost for Project A	\$ 47,481
Utah Geological Survey Cost Share (50% total cost)	\$ 23,741
Outside funding required	\$ 23,740

Project B. Evaluate Recharge of Coal Creek Water in East-Central Cedar Valley

Personnel

Research 4 weeks
Field Work 1 weeks
Gravity Survey 1 week
Report Writing 6 weeks

Fieldwork/travel

10 days per diem, 10 days vehicle rental, 1,100 vehicle miles, 8 nights hotel

Estimated cost

Total direct costs for Project B	\$ 32,268
Indirect costs (34.44% of direct costs)	\$ 11,113

Total cost for Project B	\$ 43,381
Utah Geological Survey Cost Share (50% total cost)	\$ 21,691
Outside funding required	\$ 21,690

C. Evaluate Current Cedar City Groundwater Recharge Project

Personnel

Research	3 weeks
Field Work	1 week
Gravity Survey	7 weeks
Report	7 weeks

Fieldwork/travel

40 days per diem, 40 days vehicle rental, 4,400 vehicle miles, 32 nights hotel

Estimated cost

Total direct costs for Project C	\$ 50,568
Indirect costs (34.44% of direct costs)	\$ 17,415
Total cost for Project C	\$ 67,983
Utah Geological Survey Cost Share (50% total cost)	\$ 33,992
Outside funding required	\$ 33,991

The costs above are for each project described. If more than one project is funded, they could be conducted during the same year or one year per project. If all three projects are funded, but are conducted over multiple years (requiring multiple reports) the costs would be as follows.

Estimated cost

Total direct costs for Project A-C	\$112,818
Indirect costs (34.44% of direct costs)	\$ 38,854
Total cost for Project A-C	\$151,672
Utah Geological Survey Cost Share (50% total cost)	\$ 75,836
Outside funding required	\$ 75,836

If all three projects are funded and conducted during the same year, we believe we can reduce total report writing time by as much as six weeks. This reduces overall costs by \$18,956 for a total cost of 132,716. If all three projects are funded during the same year and one overall report is written, the UGS cost share will be \$66,358 and **outside funding required** will be \$66,358.

Attachment A. Cedar Valley ASR Budget Personnel

Mike Lowe
Hugh Hurlow
Dana Interim

Task	Hourly Rate (w/fringe)	Research	Gravity	Field Work	Report	Total	Research	Gravity	Field Work	Report	Total	Research	Gravity	Field Work	Report	Total
Prog. Manager M. Lowe	66.69					40					40					40
Senior Scientist Hugh Hurlow	58.75	160	40	80	240	520	160	40	40	240	480	120	40	280	280	720
											\$ 30,867.60					\$ 44,967.60

Travel Expenses

Task	Trip	people	miles	mileage cost	vehicle days	vehicle cost	per diem days	per diem cost	hotel nights	hotel cost	total cost
A	1	1	550	\$110	5	\$120	5	\$190	4	\$280	\$700.00
A	2	1	550	\$110	5	\$120	5	\$190	4	\$280	\$700.00
A	3	1	550	\$110	5	\$120	5	\$190	4	\$280	\$700.00
			330		15	360	15	570	12	840	\$2,100.00
B	1	1	550	\$110	5	\$120	5	\$190	4	\$280	\$700.00
B	2	1	550	\$110	5	\$120	5	\$190	4	\$280	\$700.00
			220		10	240	10	380	8	560	\$1,400.00
C	1	1	550	\$110	5	\$120	5	\$190	4	\$280	\$700.00
C	2	1	550	\$110	5	\$120	5	\$190	4	\$280	\$700.00
C	3	1	550	\$110	5	\$120	5	\$190	4	\$280	\$700.00
C	4	1	550	\$110	5	\$120	5	\$190	4	\$280	\$700.00
C	5	1	550	\$110	5	\$120	5	\$190	4	\$280	\$700.00
C	6	1	550	\$110	5	\$120	5	\$190	4	\$280	\$700.00
C	7	1	550	\$110	5	\$120	5	\$190	4	\$280	\$700.00
C	8	1	550	\$110	5	\$120	5	\$190	4	\$280	\$700.00
		Total	4400	\$880	40.00	\$960	40.00	\$1,520	32.00	\$2,240	\$5,600.00

All Tasks conducted in the same year will reduce total report by six weeks or total cost by \$18,956.

TASK A	TASK B	TASK C	TASK A&B	TASK B&C	All Tasks
SUBTOTAL	\$ 35,317.60	\$ 32,267.60	\$ 50,567.60	\$ 64,917.60	\$ 112,817.60
INDIRECT	\$ 12,163.38	\$ 11,112.96	\$ 17,415.48	\$ 22,357.62	\$ 38,854.38
TOTAL	\$ 47,480.98	\$ 43,380.56	\$ 67,983.08	\$ 87,275.22	\$ 151,671.98
50% Cost Share	\$ 23,740.49	\$ 21,690.28	\$ 33,991.54	\$ 43,637.61	\$ 75,835.99
Division of Water Resources \$ Match	\$ 11,870.25	\$ 10,845.14	\$ 16,995.77	\$ 21,818.81	\$ 37,918.00
Cedar City Cost Share 50%	\$ 5,935.12	\$ 5,422.57	\$ 8,497.89	\$ 10,909.40	\$ 18,959.00

\$ 132,715.98
\$ 66,357.99

\$ 33,179.00

\$ 16,589.50 (50%)

\$ 8,294.75 (25%)

